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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/780,989	02/09/2001	Timothy G. Adams	50376	5885

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EXAMINER	
THORNTON, YVETTE C	

ART UNIT	PAPER NUMBER
1752	

DATE MAILED: 11/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/780,989	ADAMS ET AL.	
	Examiner	Art Unit	
	Yvette C. Thornton	1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 August 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *35,36,41-43 and 50-52* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *35,36,41-43 and 50-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This is written in reference to application number 09/780989 filed on February 9, 2001 and published as US 2002/0012869 A1 on January 31, 2002.

Response to Amendment

1. Claims 1-34, 37-40 and 44-49 have been cancelled. Claims 35-36, 41-43 and 50-52 are currently pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

3. Claim 43 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim as written depends upon cancelled claim 26. It is unclear to the examiner, which pending claim, claim 43 is intended to further limit. For the purposes of examination, the examiner assumes that claim 43 is intended to further limit instant claim 35.

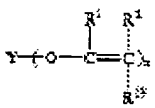
Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

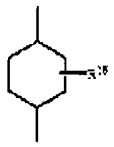
> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 35-36, 41-43 and 50-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bantu et al. (US 6,072,006) in view of Rhodes et al. (US 6,232,417 B1). Bantu teaches a process for preparing an organically soluble partially cross-linked acid labile polymer. The said polymer may be blended with a photoacid generator in a solvent to formulate a chemically amplified resist composition (c. 2, l. 40-47). The general process for generating the said polymer comprises the steps of providing a

polymer with one or more monomer units, wherein at least one of the said units contain one or more pendant COOH or OH groups; and reacting this polymer with a polyvinyl ether in the presence of an acid catalyst to form links between at least two polymer chains. In the taught invention polyvinyl ether means a compound with two or more vinyl ethers. In a further embodiment, a monovinyl ether is added to the above process to form a ketal or acetal protecting groups by functionalizing he monomer units of the COOH or OH pendant groups. A monovinyl ether is defined by the taught invention as a compound with only one vinyl ether (c. 2, l. 48-63). The process further provides a process for forming a pattern which comprises the steps of providing the chemically amplified resist composition comprising the said polymer; coating a substrate with the resist composition; imagewise exposing the resist coated substrate to actinic radiation; and forming a resist image by developing the resist coated substrate. Further processing of the substrate may take place after the formation of the image (c. 3, l. 16-24;), such as implantation of a dopant, deposition of another material on the substrate or an etching of the substrate (c. 13, l. 25-33). See also column 12, line 21-column 13, line 24. Bantu teaches that radiation sources, which can be used, are all sources, which emit radiation in which the photoacid generator is sensitive. Examples include argon ion (126 nm), krypton ion (146 nm), electron beam and x-ray sources (c. 12, l. 60-61).

The preferred hydroxyl based reactant polymers are phenolic or hydroxycycloalkyl-based polymer or mixtures thereof. The more preferred phenolic based polymer is polyhydroxystyrene (PHS) and novolak and the more preferred hydroxycycloalkyl-based reactant polymer is polyvinylcyclohexanol (c. 4, l. 1-14). Any suitable polyvinyl ether may be used for the taught crosslinking process. The preferred ether has the general formula:  (c. 4, l. 15-59). Suitable examples include cyclohexanedimethanol divinyl ether and ethylene glycol divinyl ether (c. 4, l. 60-67). See also column 5, lines 1-45. The taught polymer may further contain an alkali insoluble monomer unit having either an

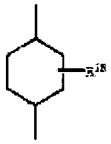
acid sensitive or non-acid sensitive group. Preferred monomer units include acid sensitive (meth)acrylates such as t-butyl methacrylate (c. 7, l. 64-c. 8, l. 6).



It is the examiner's position that when X is the taught cyclohexyl group , the limitations of claimed invention wherein the polymer is "substantially free" and "completely free" (cl. 30, 43) are met. Further, the examiner is of the position that one of ordinary skill in the art would readily envisage a composition comprising the preferred embodiments of the taught invention wherein the crosslinked polymer of the taught invention is admixed with the preferred acid sensitive monomer of t-butyl (meth)acrylate as disclosed in column 7, line 64 through column 8, line 6.

Bantu teaches all the limitations of the instant claims except it fails to explicitly discuss exposing the taught composition at 193 nm. Bantu does however disclose that radiation sources, which can be used, are all sources, which emit radiation in which the photoacid generator is sensitive. Bantu teaches a vast number of suitable photoacid generators (c. 10, l. 38-c. 11, l. 38), wherein a triphenylsulfonium salt is exemplified. It is the examiner's position that the exemplified compound is particularly preferred.

The background teachings of Rhodes et al. (US 6,232,417 B1) teach that trends in the electronics induction continually require integrated circuits that are faster and consume less power. To meet this specification the IC must be made smaller. To achieve thinner line widths, higher photoimaging resolution is necessary. Higher resolutions are possible with shorter wavelengths of the exposure source employed to irradiate the photoresist material. However photoresists, which contain aromatic groups inherently absorptive as the wavelength falls below about 300 nm. To overcome the transparency deficiencies of these polymers, the aromatic content of the polymers must be reduced. If deep UV transparency is desired (i.e., 248 nm or 193 nm exposure), the polymer should contain a minimum of aromatic character (c. 2, l. 54-c.3, l. 18). Rhodes further teaches that composition comprising triflates,

pyrogallols, onium salts, and sulfonate esters of nitro-substituted benzyl alcohols are suitable acid generators wherein triarylsulfonium or diarylsulfonium salts are preferred because of their sensitivity to deep UV light in the range of 193 to 300 nm and give very high resolution images (c. 41, l. 42-59). One of ordinary skill in the art would have been motivated by the general trend in the art, as disclosed by the background teachings of Rhodes, to exposure a composition comprising the taught polymer of Bantu, wherein X is the taught cyclohexyl group  , with 193 nm in order to make an integrated circuit which has thinner line widths. Furthermore, the teachings of Rhodes support the position that the acid generators of Bantu are inherently sensitive to exposure at 193 nm.

Response to Arguments

6. Applicant's arguments with respect to the instant claims have been considered but are of little moment in view of the new ground(s) of rejection.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

8. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette C. Thornton whose telephone number is 571-272-1336. The examiner can normally be reached on Monday-Thursday 8-6:30.

10. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

11. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Yvette C. Thornton

Yvette Clarke Thornton
Primary Examiner
Art Unit 1752

yct
November 5, 2004